Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte HWI-TZUU TAI, LORI OVERTURF,
and ISAAC AJEWOLE

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Appeal No. 1998-1395
Application No. 08/606,634

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ON BRIEF

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Before JERRY SMITH, BARRETT, and BLANKENSHIP, Administrative Patent Judges.

BLANKENSHIP, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 22-32, which are all the claims remaining in the application.

We reverse.

BACKGROUND

The invention is directed to a method and apparatus for reducing scanning artifacts (Moire pattern) in a digital sampling process, particularly for applications in document scanning and image processing. Representative claim 28 is reproduced below.

> 28. A method of processing an original halftone image represented by a set of original grey level pixels so as to generate a set of new grey level pixels at the same scale as the set of original grey level pixels, the method comprising:
>
> (a) determining a grey level value for each new grey level pixel as a function of (i) grey level values of original pixels in a group of plural neighboring original pixels, and (ii) spacings between said neighboring original pixels;
>
> (b) replacing an original grey level pixel, forming part of the group of neighboring original pixels, with the grey level value determined in accordance with step (a); and
>
> (c) repeating steps (a) and (b) using different groups of plural neighboring original pixels to generate a set of new grey level pixels that are at the same scale as the set of original grey level pixels.

The examiner relies on the following references:

Hiratsuka et al. (Hiratsuka)	4,803,558	Feb. 7, 1989
Tutt et al. (Tutt)	4,872,064	Oct. 3, 1989

Claims 22 and 28 stand rejected under 35 U.S.C. § 102 as being anticipated by Hiratsuka and by Tutt.

Claims 23, 27, and 29 stand rejected under 35 U.S.C. § 103 as being unpatentable over Hiratsuka or Tutt.

In new grounds of rejection set forth in the Examiner's Answer, claims 24 and 30 stand rejected under 35 U.S.C. § 103 as being unpatentable over Hiratsuka, and claims 24-26 and 30-32 stand rejected under the same statute as being unpatentable over Tutt.

We refer to the Final Rejection (mailed Feb. 3, 1997) and the Examiner's Answer (mailed Sep. 30, 1997) for a statement of the examiner's position and to the Brief (filed Jul. 7, 1997) and the Reply Brief (filed Dec. 1, 1997) for appellants' position with respect to the claims which stand rejected.

OPINION

In arguments presented against the rejection of independent claims 22 and 28 as being anticipated by Tutt, appellants urge that Tutt is directed "solely to processing of binary pixels and not grey level pixels." (Brief at 5.) Appellants point to a purported definition of "grey scale" in the instant specification, and refer to a portion of the Tutt disclosure as additional support for the position that "grey scale" pixels are different from "binary" pixels. (Id. at 6.)

In the Answer, the examiner does not appear to respond to appellants' observation with regard to the Tutt reference. With respect to the argued definition of "grey scale" appearing in the specification, the examiner expresses the opinion that a "grey scale system" is defined, rather than "grey level pixels."

The instant specification, at page 5, defines a "grey scale" as "a multibits per pixel grey level system." The specification, also at page 5, describes each pixel of the image of a scanned document, which is resampled in the instant invention, as having "a certain corresponding grey level."

Tutt discloses manipulating pixels composed of two states -- black and white. See, e.g., Tutt at col. 5, l. 56 through col. 6, l. 8. There appears to be no controversy with respect to that attribute of Tutt's system. Tutt at column 1, lines 53 through 60, in the description of the "Prior Art," observes that black/white systems, or systems having pixels otherwise limited to two levels, lack "grey."

We are persuaded by appellants that the broadest reasonable definition of "grey level pixels" having "grey level values," consistent with the instant specification, does not include pixels having only two possible states, such that a pixel may be represented by a single bit. The disclosure of Tutt, drawing a distinction between systems having "black/white," and those having "grey," serves as evidence that the artisan would not have considered a "grey level value" or a "grey level pixel" as inclusive of what are effectively single-bit pixels. Having agreed with appellants that a proper interpretation of the terms of claims 22 and 28 requires manipulation of multi-bit pixels, it follows that we cannot agree that Tutt supports a finding of anticipation. We therefore do not sustain the section 102 rejection of the claims as anticipated by Tutt.

With respect to the section 102 rejection of claims 22 and 28 over Hiratsuka, appellants argue that there is no anticipation because "[t]he claims as now presented include the feature of using grey level values of the original pixels and distances between the original pixels to determine the grey level values of the new pixels." (Brief at 5.)

The Answer's statement of the rejection does not point out where Hiratsuka discloses the feature of using distances between original pixels in the determination of grey level values for the new pixels. In the Answer's response to appellants' arguments, the examiner indicates that Hirasuka "inherently" uses distances between pixels in performing interpolation, and refers to Fig. 12 and column 9, lines 41 through 63 of the reference. The examiner further refers to a "ratio of distances" between pixels as shown in Figs. 12a and 12b.

Appellants respond (Reply Brief at 7) that column 9, lines 41 through 63 of Hiratsuka is not descriptive of the reference's Figure 12, and allege there is no use of "distance" in interpolation. Appellants further argue (id. at 6-7) that the operation represented by Figure 12 does not make use of distances between original pixels.

Hiratsuka describes Figure 12 at column 8, line 60 through column 9, line 13. Dither matrix 2-c is applied to enlarged halftone image 12-a, yielding enlarged, binary coded dither image 12-e. Dither matrix 12-d is applied to reduced halftone image 12-b, yielding enlarged, binary coded dither image 12-f.

Applying a dither matrix to a halftone image is also described at column 4, line 29 through column 5, line 24, and shown in Figures 2-a through 2-c. Hiratsuka's main concern, however, is another process -- estimating a halftone image, as described in the Abstract. Hiratsuka, at column 1, refers to a prior art method of applying a dither matrix to a halftone image for representing the images with black and white dots, as pictured in Hiratsuka's Figure 30-a, and which is apparently no different from the method implied in Figure 12. There is no disclosure of making any use of distances between neighboring original pixels.

Hiratsuka at column 8, lines 53 through 59 discloses that the halftone images as seen in Figure 12 are enlarged or reduced by "[f]or instance, an interpolation method." The rejection may be suggesting that the undisclosed "interpolation method" uses distances between neighboring original pixels. However, appellants dispute any suggestion of inherency. Although challenged on the allegation of "inherency," the examiner has not provided any evidence (e.g., an additional, explanatory reference) to support the view that the undisclosed "interpolation method" requires the use of distances between neighboring original pixels. Our reviewing court has set out clear standards for establishing inherency.

> To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." "Inherency, however, may not be established by probabilities or

> possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient."

In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted).

Based on the evidence before us, we cannot agree with the examiner's finding that Hiratsuka inherently uses distances between neighboring original pixels in the "interpolation method," nor in any other methods disclosed by Hiratsuka. Since making use of the distances are requirements of each of independent claims 22 and 28, we do not sustain the section 102 rejection of the claims as being anticipated by Hiratsuka.

In view of the above-noted deficiencies of Tutt and Hiratsuka with respect to independent claims 22 and 28, we cannot sustain any of the section 103 rejections applied against the dependent claims. The section 103 rejections do not remedy the basic deficiencies of the prior art applied against claims 22 and 28, and the requirements thereof are incorporated by the dependent claims.

CONCLUSION

The rejection of claims 22-32 is reversed.

REVERSED

JERRY SMITH Administrative Patent Judge	)))))) BOARD OF PATENT
LEE E. BARRETT Administrative Patent Judge	) APPEALS) AND) INTERFERENCES
HOWARD B. BLANKENSHIP Administrative Patent Judge	)))))

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